

Air Quality and GEOSS Meeting. Nov 18th, 2009. Washington DC

# The WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)

A Global Consortium Helping Society Reduce Risk  
Through Research, Assessments and Forecasts

Carlos Pérez García-Pando<sup>1</sup>, Leonard Barrie<sup>2</sup>, Slobodan Nickovic<sup>2</sup>, José María Baldasano<sup>3</sup>,  
Emilio Cuevas<sup>4</sup>, Michael Schulz<sup>5</sup>

<sup>1</sup> The Earth Institute at Columbia University, NASA Goddard Institute for Space Studies & International Research  
Institute for Climate and Society. New York, USA.

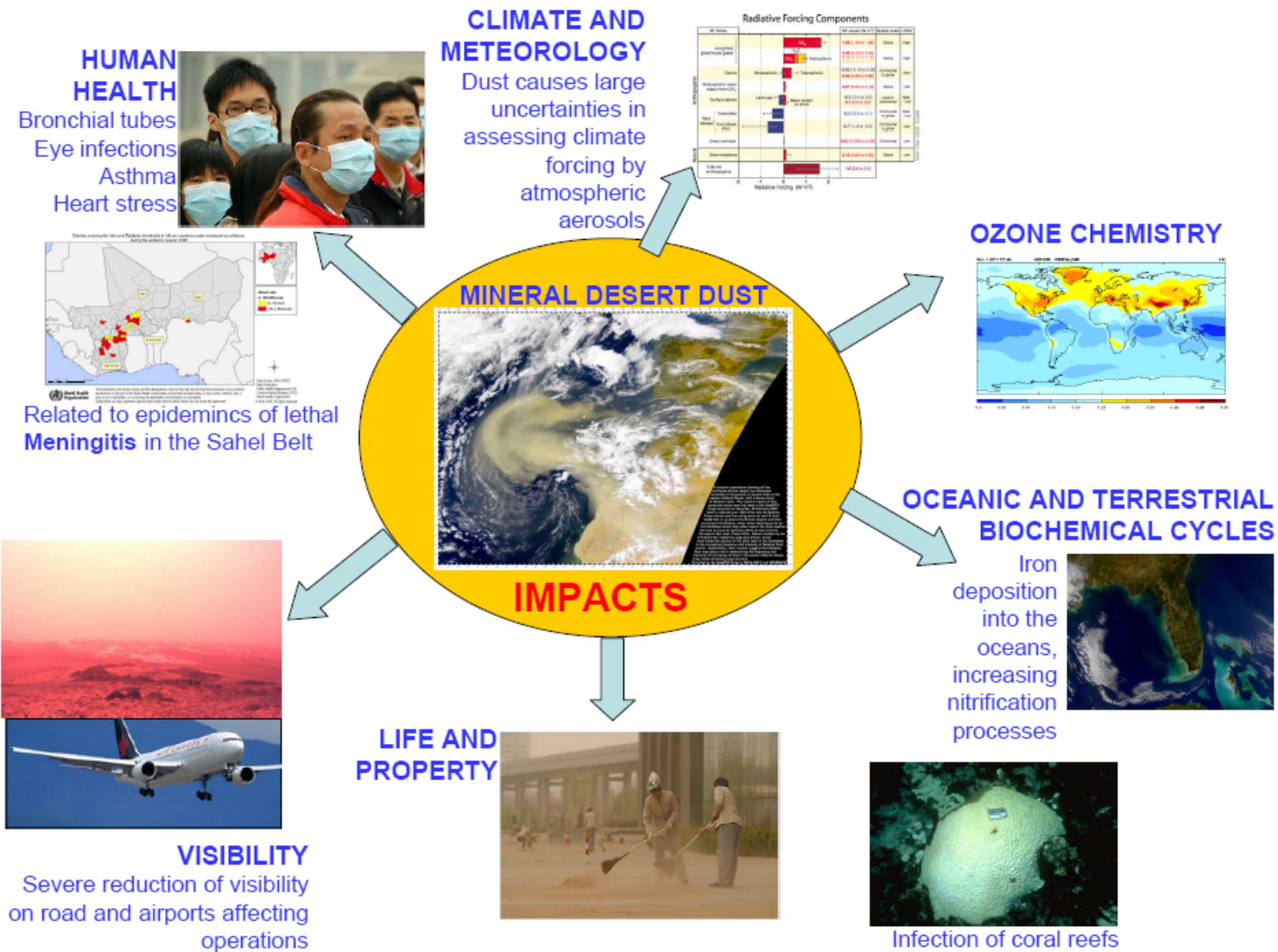
<sup>2</sup> Research Department, World Meteorological Organization. Geneva, Switzerland.

<sup>3</sup> Barcelona Supercomputing Center. Barcelona, Spain.

<sup>4</sup> AEMET, Spain.

<sup>5</sup> Laboratoire des Sciences du Climat et l'Environnement. France.

# Sand and Dust Storm Impacts



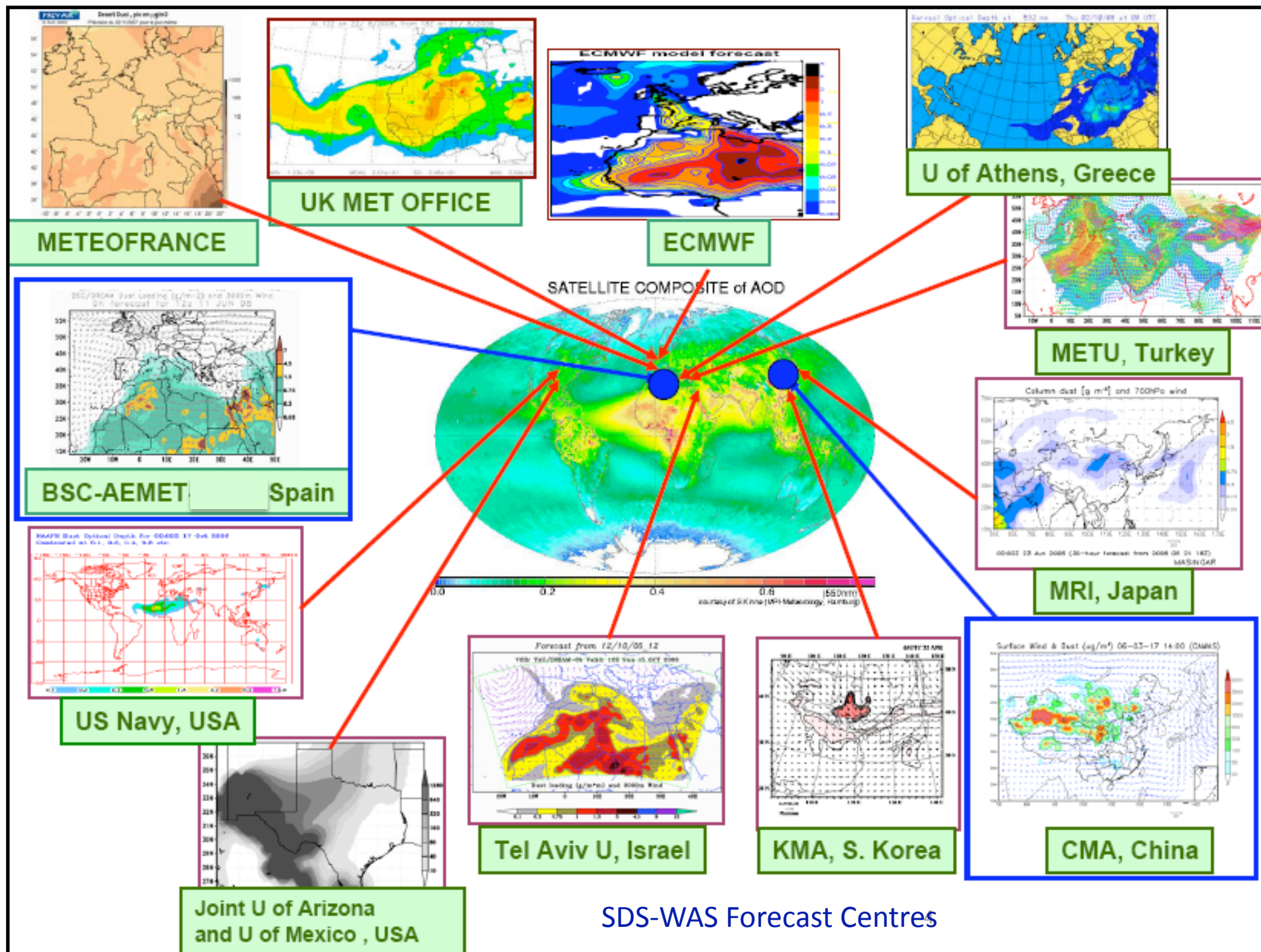
# SDS-WAS Mission

**To enhance the ability of countries to deliver:**

- timely and quality forecasts of sand and dust storms,
- observations and
- information and knowledge to users

**through**

- an international partnership of research and operational experts and users



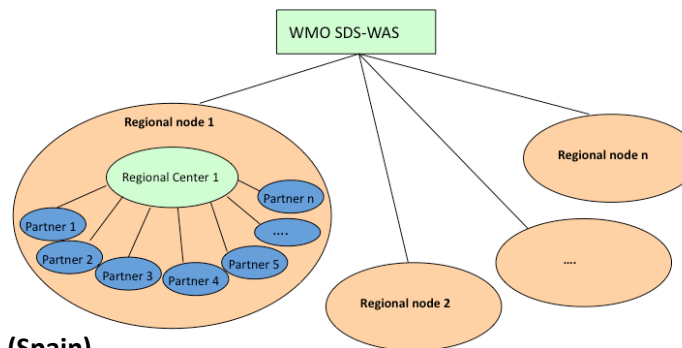
SDS-WAS Forecast Centres

# Objectives

- Provide user communities access to forecasts, observations and information of the SDS through regional centres connected to the WMO Information System (WIS) and the World Wide Web.
- Identify and improve SDS products through consultation with the operational and user communities
- Enhance operational SDS forecasts through technology transfer from research
- Improve forecasting and observation technology through coordinated international research and assessment
- Build capacity of relevant countries to utilize SDS observations, forecasts and analysis products for meeting societal needs



# A Federated System of Regional Nodes Bringing Modeling, Research, Observations and Users Together



**Regional Center for Northern Africa,  
Middle East and Europe: AEMET and BSC-CNS (Spain)**

**Partners of the regional node (list not exhaustive):**

Meteo-France, UK Met Office, ECMWF, LISA, LSCE,  
IFT, EUMETSAT, CNR, AERONET/PHOTONS,  
Tunisian Met Service, University of Athens,  
University of Tel Aviv, Egyptian Meteorological Agency,  
METU

The screenshot shows the homepage of the Northern Africa-Middle East-Europe (NA-ME-E) Regional Center. The header includes the WMO logo and the text 'NORTHERN AFRICA-MIDDLE EAST-EUROPE (NA-ME-E) REGIONAL CENTER' and 'WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)'. The main content area features a large satellite image of a dust storm over the Mediterranean. A sidebar on the left lists navigation links: Home, About Us, Contact Us, Forecasts & Products, News & Events, and Research. The main heading is 'WMO SDS Regional Node North Africa and Mediterranean' with a sub-heading 'LATEST RGB dust image (courtesy of EUMETSAT)'. At the bottom, there is a table with the following content:

No SDS	Research Mode/Status	Web Cam
Suspended dust	Science Highlights	camera signal error 17th November 2009 10:43:13 AM
Blowing sand	Forecast Data Sharing	
Sand And Dust Storm	Resources	
Severe SDS	Data Sharing	
Extreme Severe SDS	Publications	

<http://www.bsc.es/sds-was/>

**Regional Center for Asia/Central-Pacific:  
China Meteorological Agency**

**Partners of the regional node:**

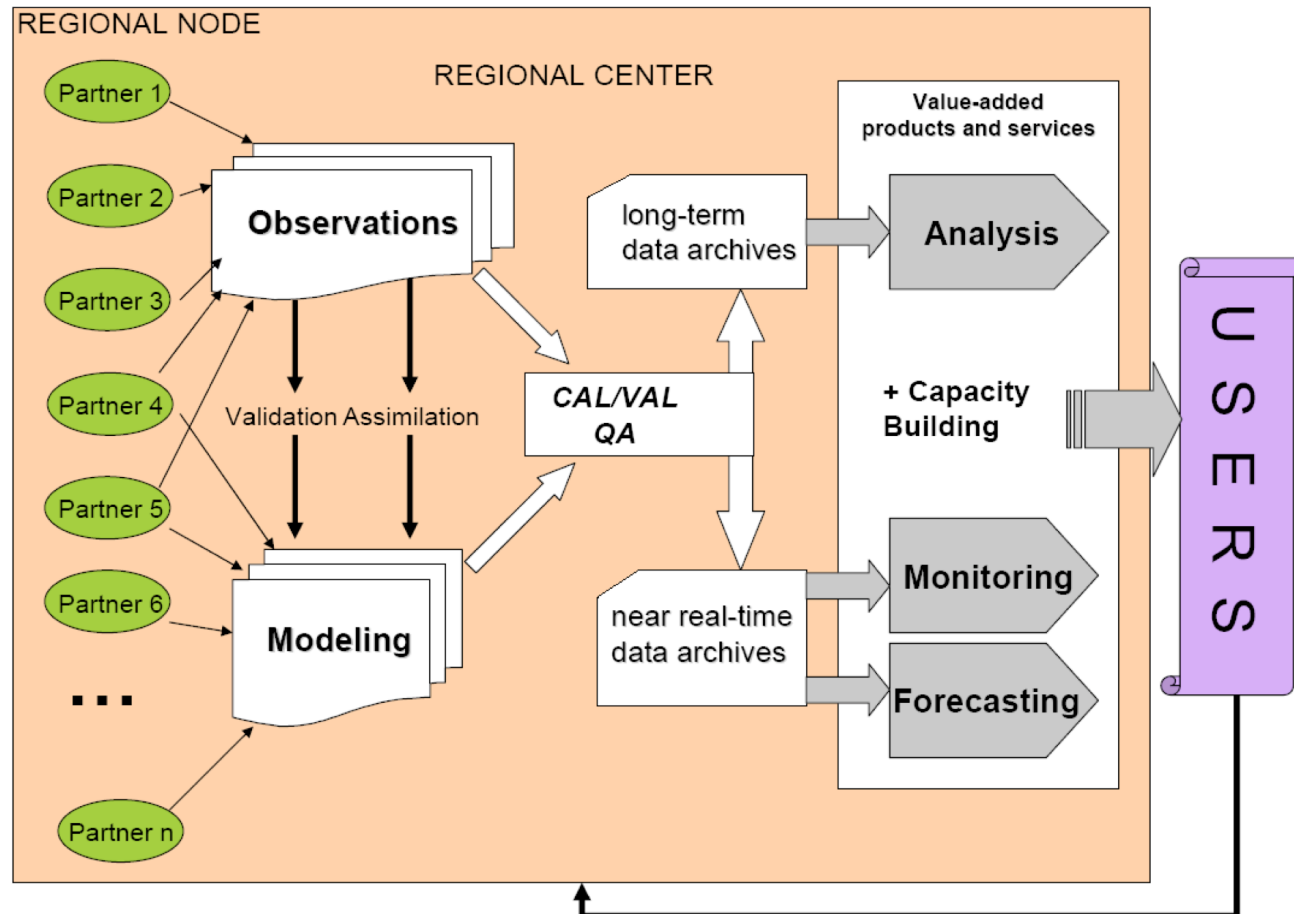
Japan Meteorological Agency  
Korea Meteorological Agency

The screenshot shows the homepage of the Asia/Central Pacific Regional Centre. The header includes the WMO logo and the text 'WMO Sand and Dust Storm Warning Advisory and Assessment System (WMO SDS-WAS)' and 'ASIA/CENTRAL PACIFIC REGIONAL CENTRE'. The main content area features a map of the region with a color scale for dust concentration. A sidebar on the left lists navigation links: Home, About Us, Contact Us, Forecasts & Products, News & Events, and Research. The main heading is 'WMO SDS Regional Node Asia/Central Pacific'. At the bottom, there is a table with the following content:

No SDS	Research Mode/Status	Web Cam
Suspended dust	Science Highlights	camera signal error 17th November 2009 10:43:13 AM
Blowing sand	Forecast Data Sharing	
Sand And Dust Storm	Resources	
Severe SDS	Data Sharing	
Extreme Severe SDS	Publications	

<http://www.sds.cma.gov.cn/>

# A Federated System of Regional Nodes Bringing Modeling, Research, Observations and Users Together



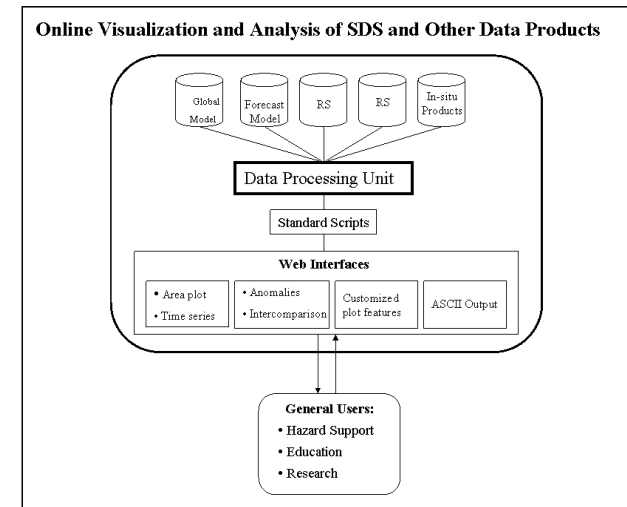
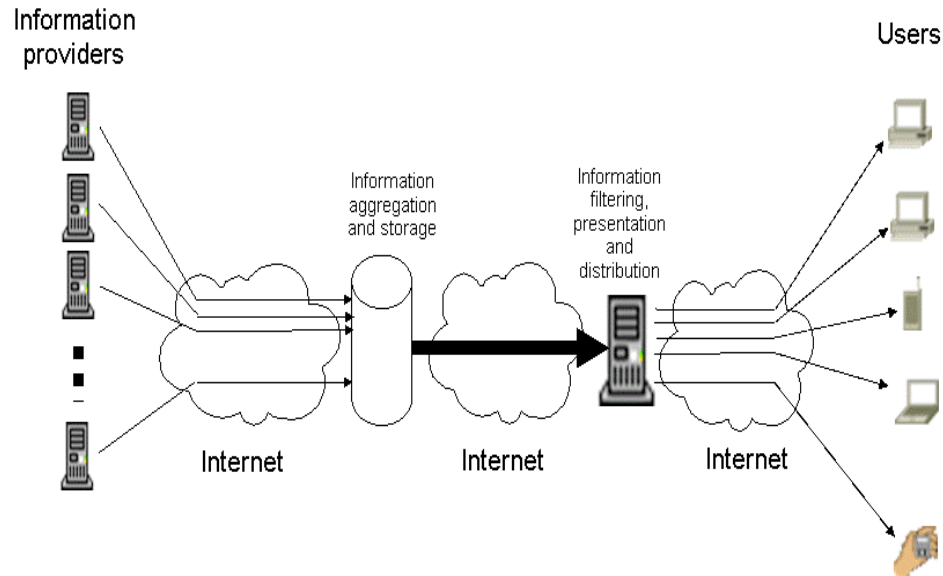
Flow of information between SDS-WAS system components for a regional node consisting of a consortium of partners supported by a Regional Steering Group and Regional Centre

# What data or service does/will the Project produce?

- SDS forecasts and model climatologies
  - ✓ Products: PM2.5, PM10, AOD, deposition, visibility
  - ✓ Visual maps, gridded data, time series for selectable sites, vertical profiles
- Observations and near-real time verification
  - ✓ qualitative and quantitative common verification system for all participating forecast models
  - ✓ Verification data: Satellites, sun-photometer networks, synop and metar visibility, pm networks
  - ✓ Linking to SDS relevant satellite data platforms (GIOVANNI, EUMETSAT,...)
- Off-line validation platform for model climatologies and experiments (AEROCOM)
- Other Services:
  - Capacity building for users
  - Connecting data providers with users. MERIT project (meningitis) is an example.



# How does/will the Project deliver data / services?



- ✓ Web-based
- ✓ Fast and reliable real time or near real time data and imagery access;
- ✓ Historical data access;
- ✓ Data integration from multi-sensor, multi-satellite and modeling products;
- ✓ Analytical capabilities;
- ✓ Products targeting users at different levels;

# How could the Project also deliver data / services?

## SDS WAS through EUMETCAST:

- Near real time data archives and visual information
- Long term data base archive (value-added products)

[www.eumetsat.int/Home/Main/What\\_We\\_Do/EUMETCast/](http://www.eumetsat.int/Home/Main/What_We_Do/EUMETCast/)

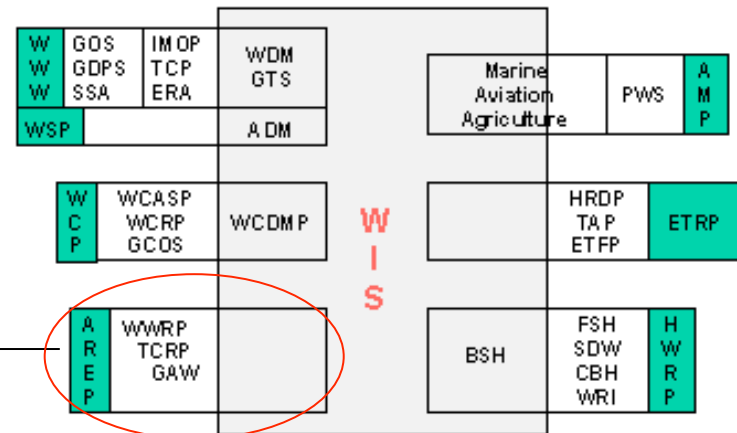
## The WMO Information System (WIS)

It is an overarching approach and a single coordinated global infrastructure for the collection, distribution, retrieval of, and access to data and information of all WMO and related programmes.

[www.wmo.ch/pages/prog/www/WIS-Web/home.html](http://www.wmo.ch/pages/prog/www/WIS-Web/home.html)

WIS relationship to WMO Programmes

SDS WAS



## Who are the Project's intended target audience / users?

- Air quality agencies (regional and local)
- National Meteorological Services
- Aviation and ground transportation authorities
- Decision makers (health, agriculture)
- Researchers (ocean community, health community, planning experimental campaigns)

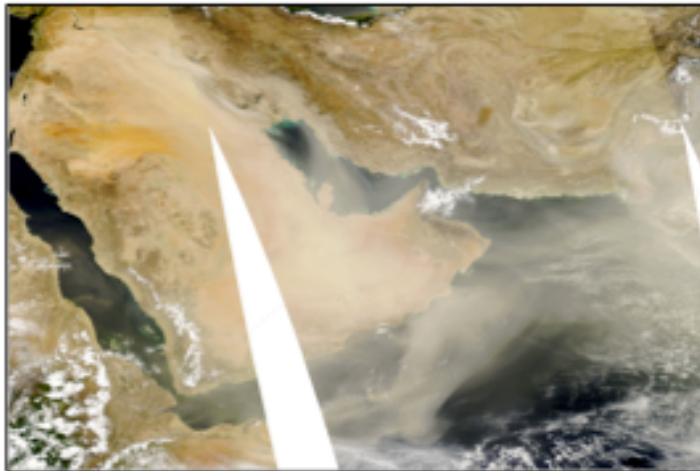
# What decision/action does/will the project support?

## Example: respiratory health and transportation



[Kuwait Times - 22 June, 2008](#)

Sand storms in the northern Gulf have *disrupted oil exports* for several days from OPEC members Iraq and Kuwait. The storms had prevented seven of eight ships from docking there since Saturday.



[www.arabianbusiness.com – 20 June 2008](#)

More than 500 **traffic accidents** were reported in Kuwait in the space of just 48 hours on Thursday and Friday, while in Bahrain a further 20 accidents were reported, according to local media.

Hospitals in all three Gulf states reported large numbers of patients being admitted with **respiratory problems**. In Bahrain, more than 150 people required hospital treatment, Bahrain's Gulf Daily News reported.

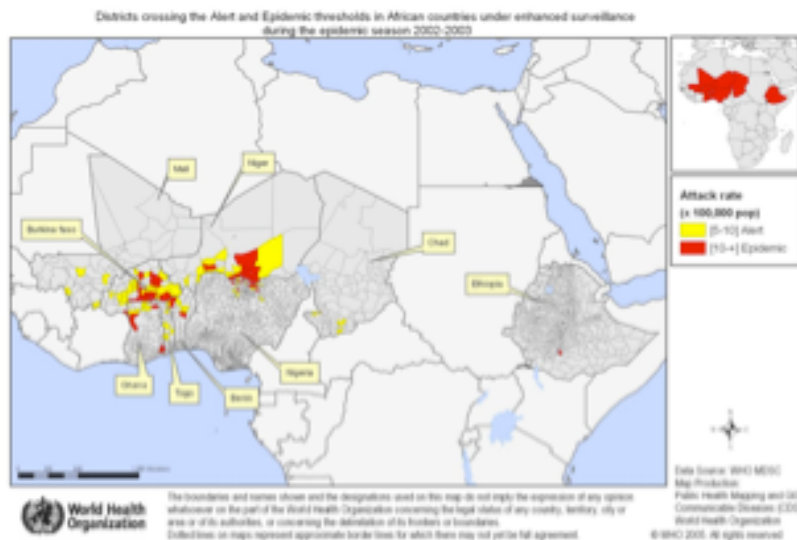
The adverse weather conditions also caused some **problems at airports** around the region, with both Bahrain and Kuwait reporting minor disruption.

# What decision/action does/will the project support?

## Another example: Meningitis epidemics

MERIT project is a collaborative effort of the World Health Organization (WHO) and members of the environmental, public health and epidemiological communities. Other member organizations of MERIT: GEO, AEMET, HCF, IRI, WMO, MVP project, Ethiopian Climate and health Working Group, and other....

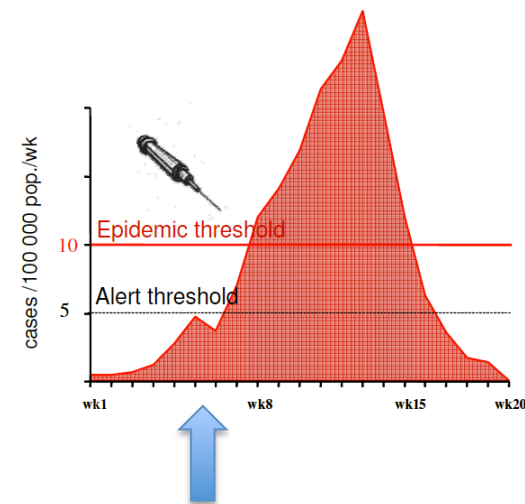
!!! Meningitis epidemics associated to dry and dusty weather in the Sahel during the dry season



### Map of Epidemic Meningitis thresholds

One of the most feared epidemic diseases in Africa  
High fatality rates; brain damage

**CHALLENGE:**  
timely  
vaccination to  
optimize the  
control of the  
epidemics



SDS products together with other climate data to support decision making at WHO to optimize reactive vaccination campaigns at district level

# What particular data sharing issues face the AQ community? Discussion

- SDS models current approach for data format is Netcdf CF convention with AEROCOM aerosol standards
- Grib2 may be used in the future but still needs standardization for aerosol.
- Data sharing rights is an issue for some data providers
- How to effectively link to GEOSS?



# WMO contacts

- Len Barrie: LBarrie@wmo.int
- Slobodan Nickovic: SNickovic@wmo.int